Changes for the Better

MITSUBISHI ELECTRIC

SPLIT-TYPE, AIR CONDITIONERS

OUTDOOR UNIT

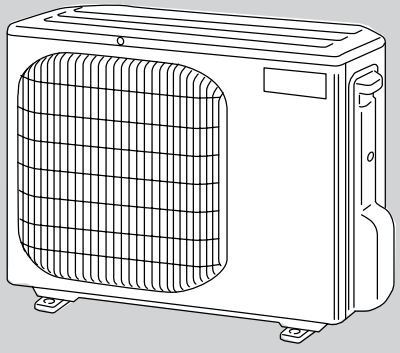
SERVICE MANUAL

No. TBH016

Wireless type
Models

MU-GD08ND- C1
MU-GD10ND- C1
MU-GD12ND- C1

Indoor unit service manual
MS-GD·ND Series (TBH014)



MU-GD08ND- C1

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PARTS CATALOG (TBB016)

Mr.SLIM™

NOTE:
- RoHS compliant products have <G> mark on the spec name plate.

1 TECHNICAL CHANGES

MU-A08ND- C2 → MU-GD08ND- C1

1. Compressor has been changed. (2R10S3R236A-6B → KS-098NARC)
2. Outdoor fan motor has been changed. (RA6N33-AA → RA6V21-BE)
3. Outdoor heat exchanger has been changed.
4. Compressor capacitor has been changed.
5. Fan motor capacitor has been changed.

MU-A12ND- C1 → MU-GD12ND- C1

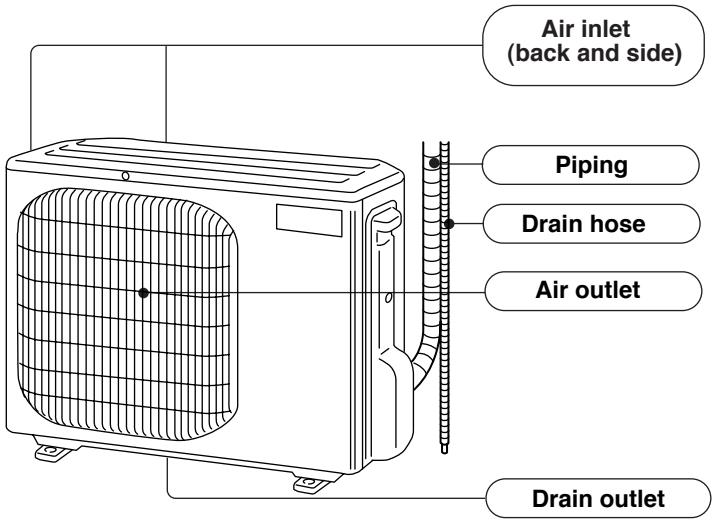
1. Compressor has been changed. (RH174NHNT → RH189NRAT)
2. Outdoor fan motor has been changed. (RA6N30-BA → RA6V33-MC)
3. Compressor capacitor has been changed.
4. Fan motor capacitor has been changed.

MU-A10ND- C2 → MU-GD10ND- C1

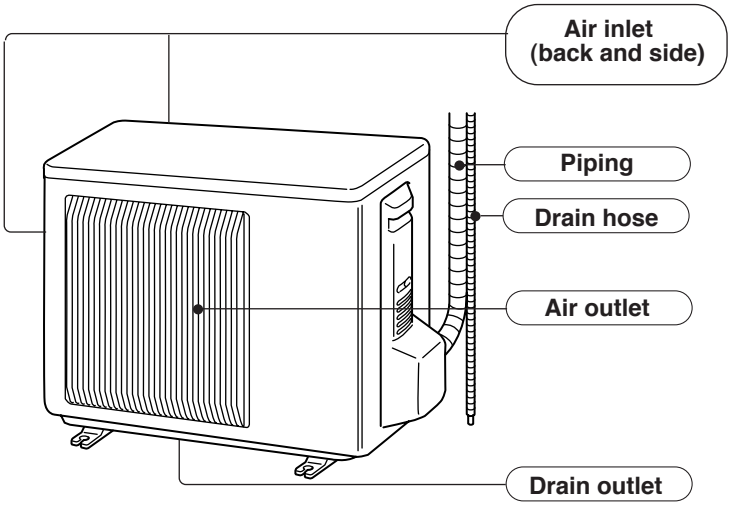
1. Model name changed.

2 PART NAMES AND FUNCTIONS

MU-GD08ND



MU-GD10ND
MU-GD12ND



3 SPECIFICATION

Outdoor model			MU-GD08ND - C1	MU-GD10ND - C1	MU-GD12ND - C1
Function			Cooling		
Power supply			Single phase 220-230V, 60Hz		
Capacity	Capacity	kW	2.2-2.2	2.9-2.9	3.6-3.6
	Dehumidification	ℓ /h	0.1	0.45	1.1
	Air flow	m³ /h	1896-1962	1452-1524	2106-2124
Electrical data	Power outlet	A	10	10	10
	Running current (Total)	A	3.19-3.24	4.31-4.31	5.7-5.7
	Power input (Total)	W	680-685	930-930	1210-1210
	Power factor (Total)	%	97-92	98-94	96-92
	Starting current	A	19	26	40
	Compressor motor current	A	2.67-2.71	3.86-3.85	5.14-5.13
	Fan motor current	A	0.330-0.340	0.260-0.270	0.370-0.380
Coefficient of performance (C.O.P)			3.24-3.21	3.12-3.12	2.98-2.98
Compressor	Model		KS098NARC	RH145NHNT	RH189NRAT
	Output	W	500	700	900
	Winding resistance (at 20℃)	Ω	C-R 3.54 C-S 4.90	C-R 2.74 C-S 3.78	C-R 1.50 C-S 2.33
Fan motor	Model		RA6V21-BE	RA6N21-AB	RA6V33-MC
	Winding resistance (at 20℃)	Ω	WHT-BLK 252 BLK-RED 278	WHT-BLK 384 BLK-RED 259	WHT-BLK 141 BLK-RED 175
Dimensions WxHxD		mm	684x540x255	800x550x285	
Weight		kg	22	34	35
Special remarks	Sound level	dB	46-47	46-46	50-51
	Fan speed	rpm	820-830	690-720	980-990
	Fan speed regulator		1		
	Refrigerant filling capacity (R22)	kg	0.55	1.10	
	Refrigeration oil (Model)	cc	300(NM56)		520(NM56)

NOTE: Test conditions are based on CNS 14464

Cooling : Indoor Dry-bulb temperature 27°C Wet-bulb temperature 19°C

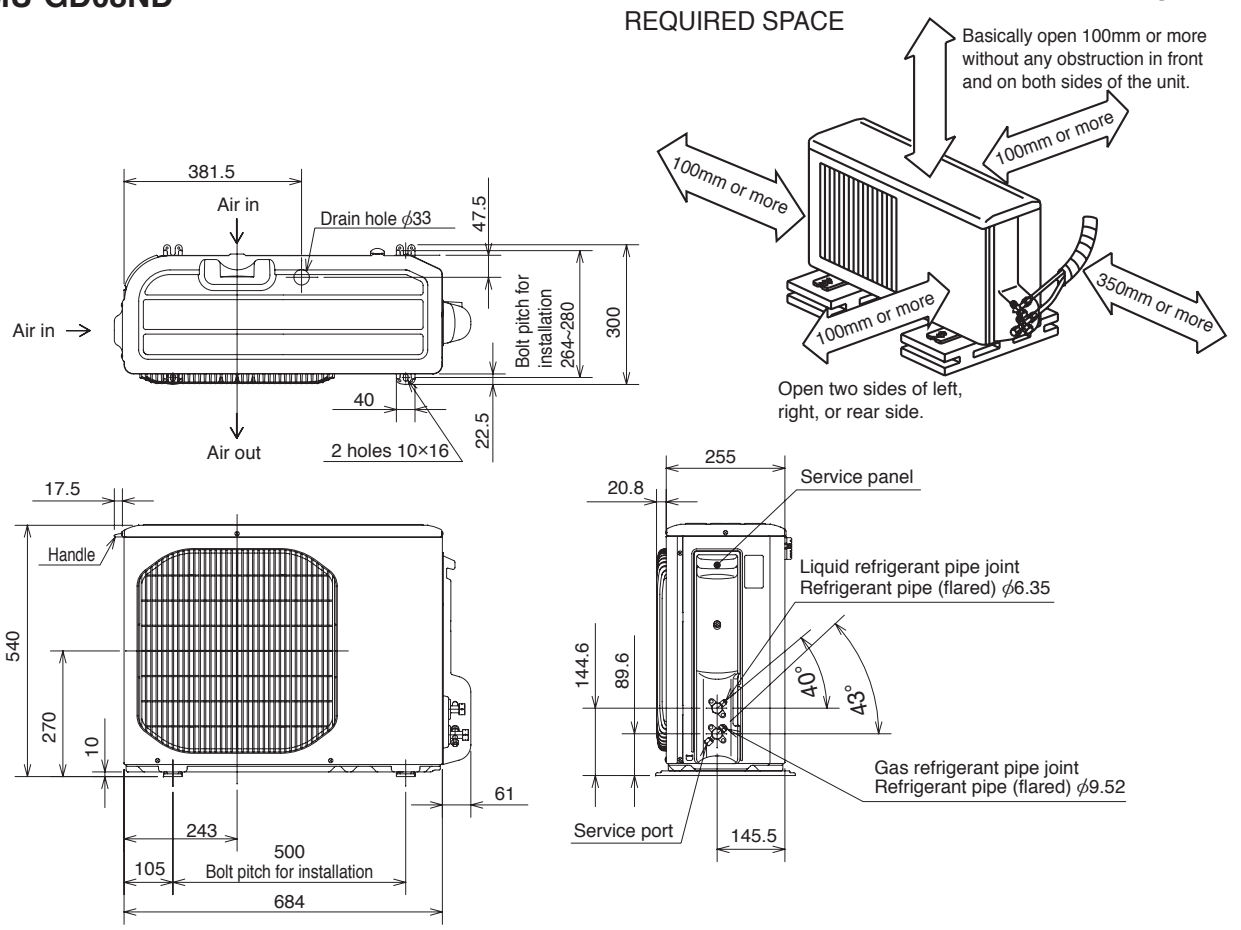
Outdoor Dry-bulb temperature 35°C Wet-bulb temperature 24°C

Refrigerant piping length (one way) 7.5 m

4 OUTLINES AND DIMENSIONS

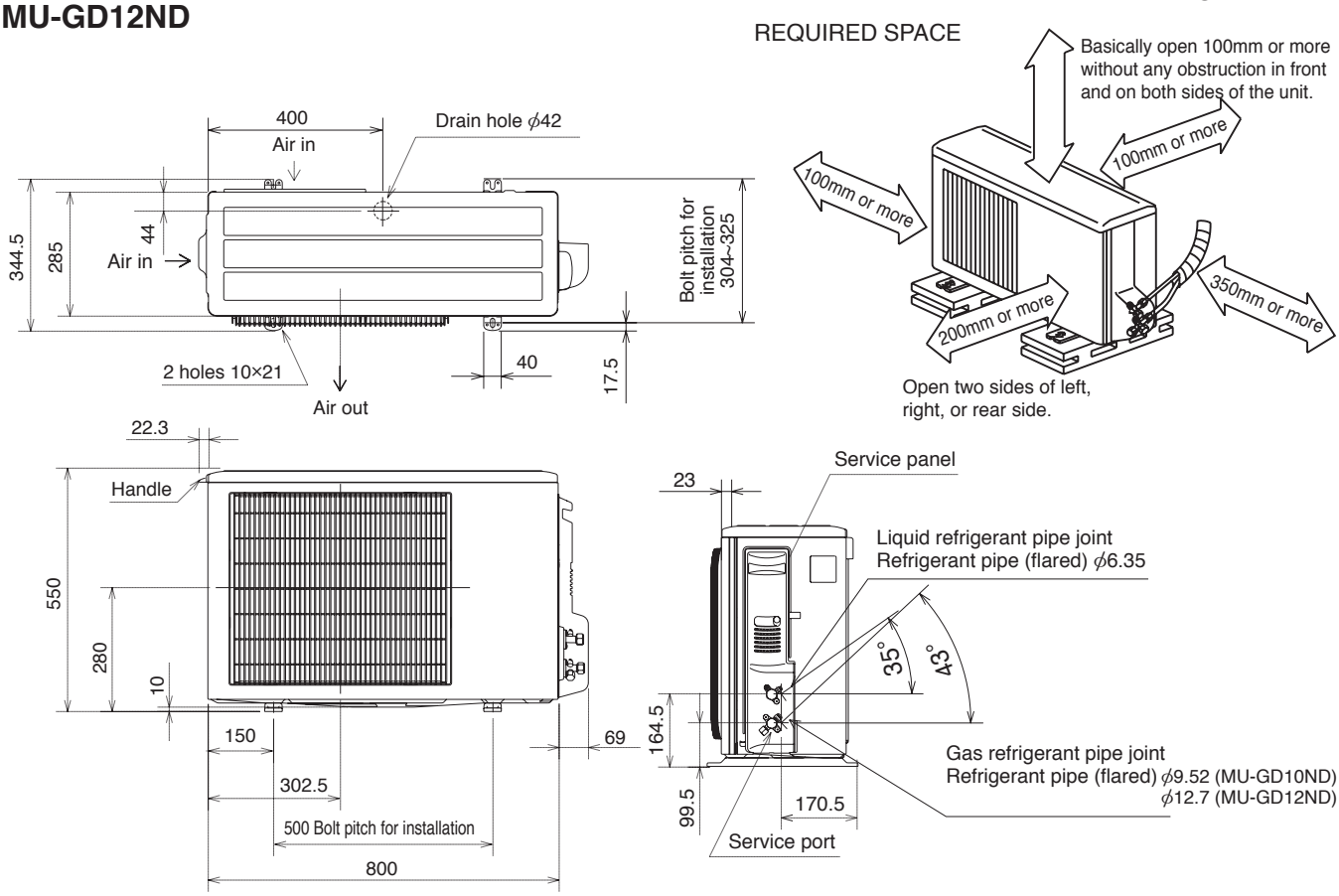
MU-GD08ND

Unit : mm



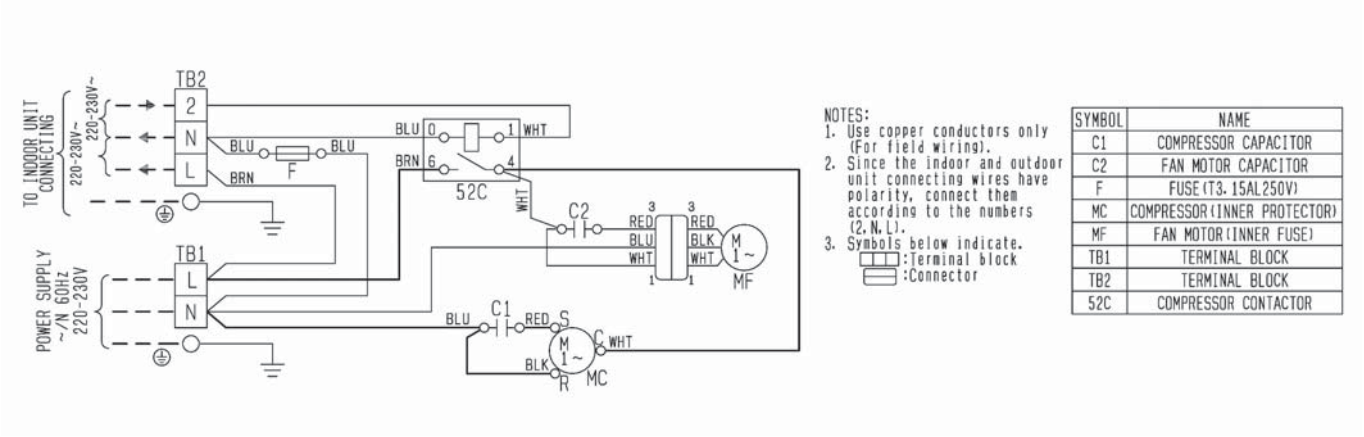
MU-GD10ND
MU-GD12ND

Unit : mm



5 WIRING DIAGRAM

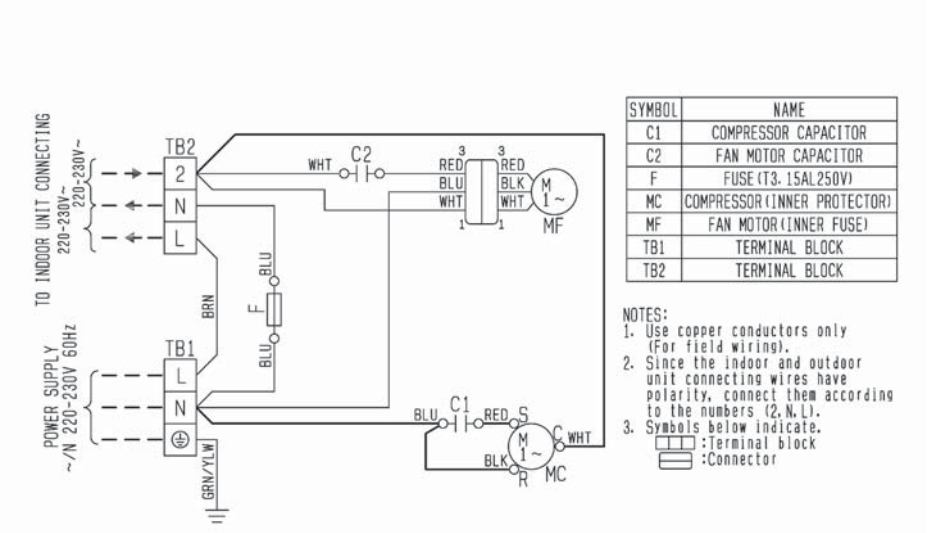
MU-GD08ND



NOTES:
1. Use copper conductors only (For field wiring).
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers (2, N, L).
3. Symbols below indicate.
   □□□ :Terminal block
   ▭ :Connector

SYMBOL	NAME
C1	COMPRESSOR CAPACITOR
C2	FAN MOTOR CAPACITOR
F	FUSE (T3.15AL250V)
MC	COMPRESSOR (INNER PROTECTOR)
MF	FAN MOTOR (INNER FUSE)
TB1	TERMINAL BLOCK
TB2	TERMINAL BLOCK
52C	COMPRESSOR CONTACTOR

MU-GD10ND



NOTES:
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   □□□ :Terminal block
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SYMBOL	NAME
C1	COMPRESSOR CAPACITOR
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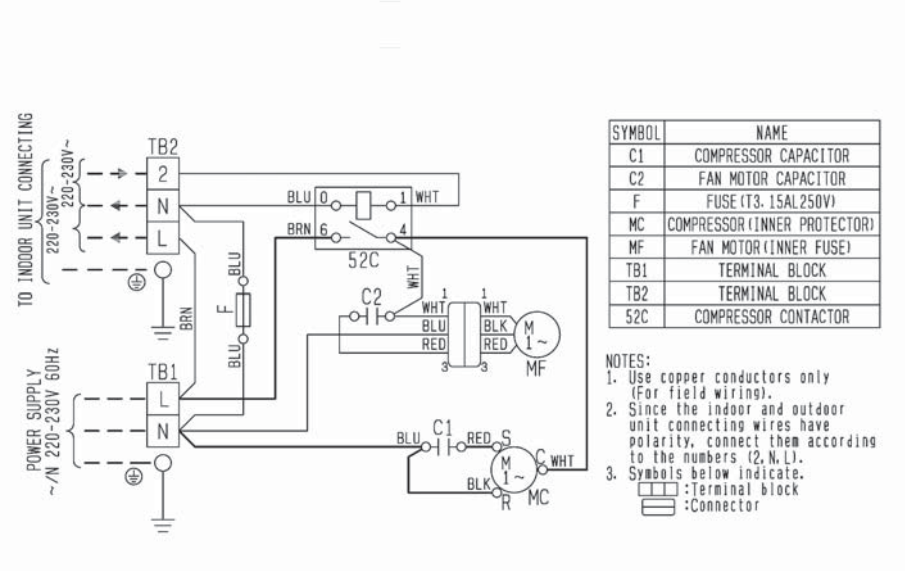
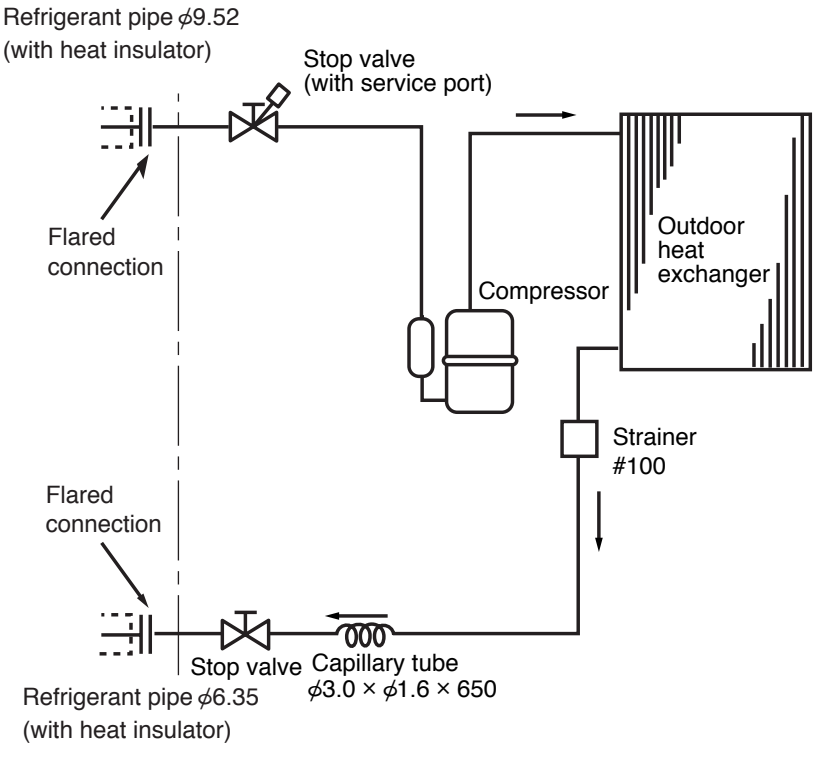
F	FUSE (T3.15AL250V)
MC	COMPRESSOR (INNER PROTECTOR)
MF	FAN MOTOR (INNER FUSE)
TB1	TERMINAL BLOCK
TB2	TERMINAL BLOCK

MU-GD12ND

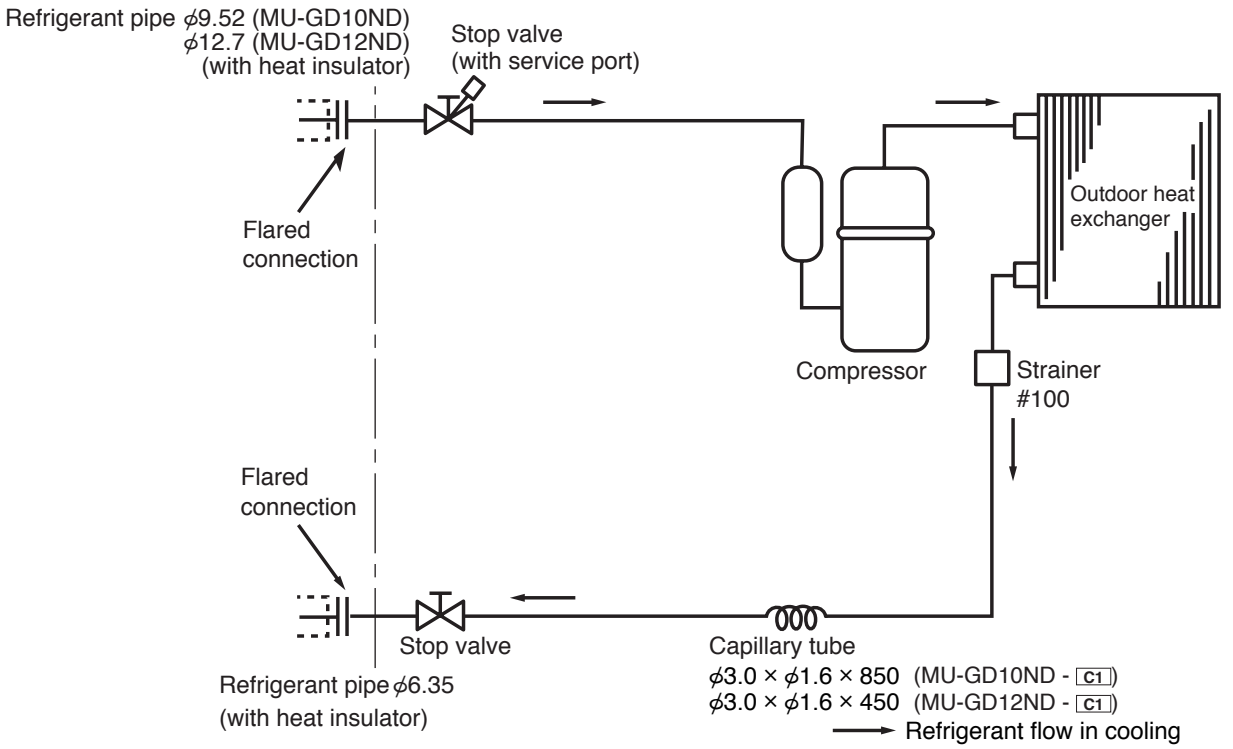


6 REFRIGERANT SYSTEM DIAGRAM

MU-GD08ND



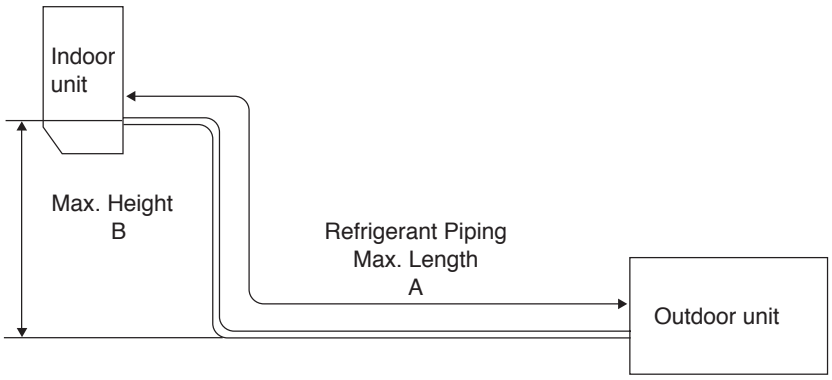
MU-GD10ND
MU-GD12ND



MAX.REFRIGERANT PIPING LENGTH

Model	Refrigerant piping : m		Piping size O.D : mm	
	Max. length A	Max. height B	Gas	Liquid
MU-GD08ND - C1	20	10	ø9.52	ø6.35
MU-GD10ND - C1				
MU-GD12ND - C1			ø12.7	

MAX.HEIGHT DIFFERENCE



ADDITIONAL REFRIGERANT CHARGE(R22 : g)

Model	Outdoor unit precharged	Refrigerant piping length (one way)			
		7m	10m	15m	20m
MU-GD08ND - C1	550	0	45	120	195
MU-GD10ND - C1	1100				
MU-GD12ND - C1					

NOTE : Calculation : Xg=15g/m x (Refrigerant piping length (m)-7)

7 PERFORMANCE CURVES

MU-GD08ND MU-GD10ND MU-GD12ND

The standard data contained in these specifications apply only to the operation of the air conditioner under normal conditions. Since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE

198 ~ 253V, 60Hz

(2) AIR FLOW

Air flow should be set at MAX.

(3) MAIN READINGS

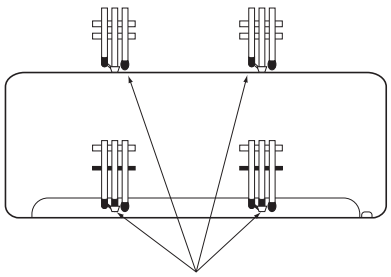
(1) Indoor intake air wet-bulb temperature : °CWB
(2) Indoor outlet air wet-bulb temperature : °CWB
(3) Outdoor intake air dry-bulb temperature : °CDB
(4) Total input: W

Indoor air wet/dry-bulb temperature difference on the left side of the chart on next page shows the difference between the indoor intake air wet/dry-bulb temperature and the indoor outlet air wet/dry-bulb temperature for your reference at service.

How to measure the indoor air wet/dry-bulb temperature difference

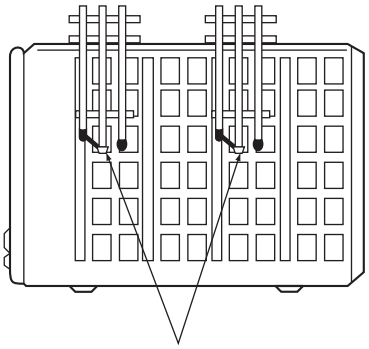
1. Attach at least 2 sets of wet and-dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet and dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of wet and dry-bulb thermometers to the outdoor air intake. Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of the room.
5. Press the EMERGENCY OPERATION switch once to start the EMERGENCY COOL MODE.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.

INDOOR UNIT

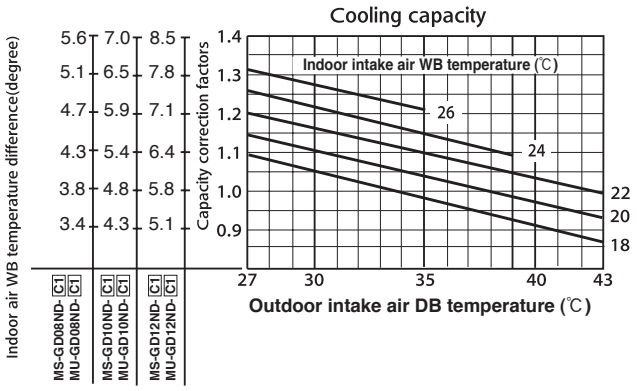


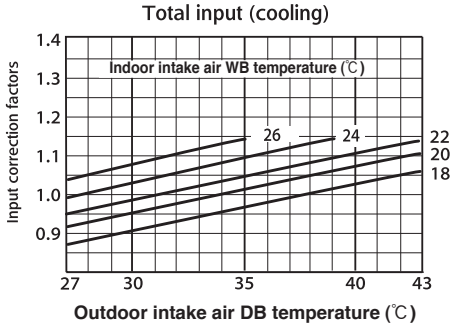
FRONT VIEW

OUTDOOR UNIT



BACK VIEW





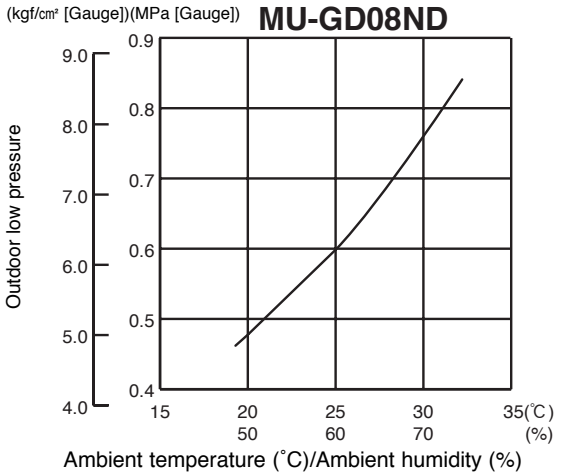
OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT
COOL operation

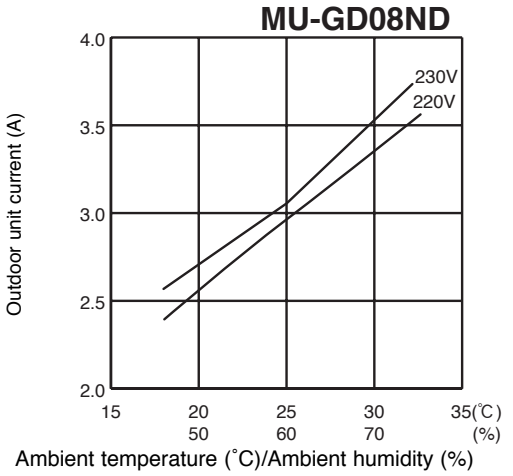
① Both indoor and outdoor units are under the same temperature/humidity condition.

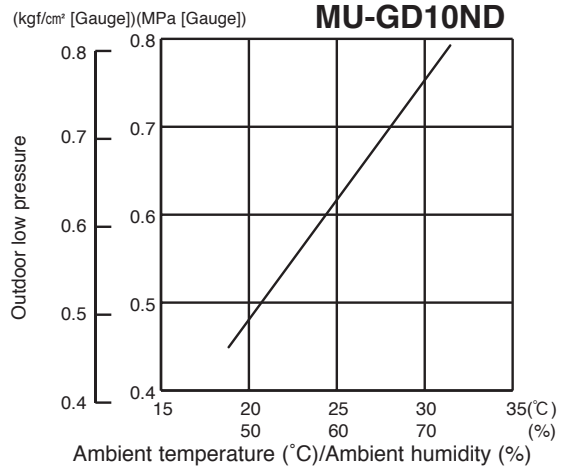
Dry-bulb temperature (℃)	Relative humidity (%)
20	50
25	60
30	70

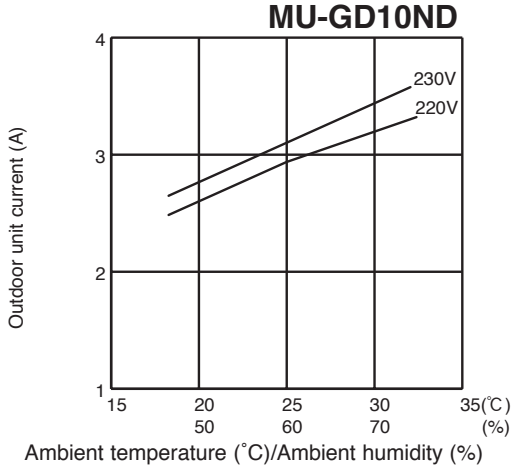
② Air flow should be set at MAX.

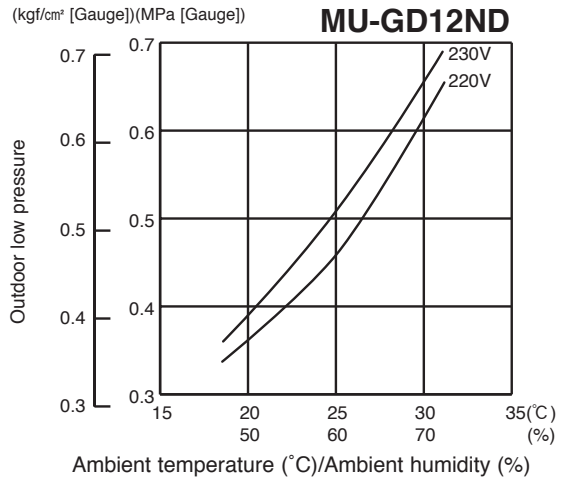
③ The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is : **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

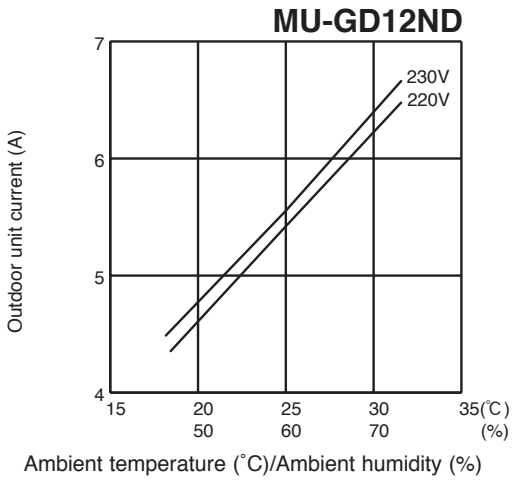












8 TROUBLESHOOTING

MU-GD08ND MU-GD10ND MU-GD12ND

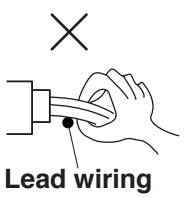
8-1. Cautions on troubleshooting

1. Before troubleshooting, check the following:

1) Check the power supply voltage.
2) Check the indoor/outdoor connecting wire for mis-wiring.

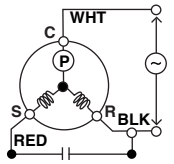
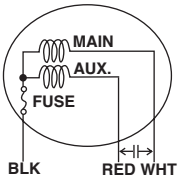
2. Take care of the following during servicing

1) Before servicing the air conditioner, be sure to turn OFF the main unit first with the remote controller, and then after confirming the horizontal vane is closed, turn OFF the breaker and / or disconnect the power plug.
2) Be sure to turn OFF the power supply before removing the front panel, the cabinet, the top panel and the electronic control P.C. board.
3) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
4) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



8-2. Trouble criterion of main parts

MU-GD08ND
MU-GD10ND
MU-GD12ND

Part name	Check method and criterion	Figure
Compressor (MC) INNER PROTECTOR **MU-GD08ND-** C1 155±5℃ OPEN 90±10℃ CLOSE **MU-GD10/GD12ND-** C1 150±5℃ OPEN 90±10℃ CLOSE	Measure the resistance between the terminals with a tester. (Coil wiring temperature -10°C ~ 40°C)	
Outdoor fan motor (MF) INNER FUSE **MU-GD08/GD12ND-** C1 126±2℃ OPEN **MU-GD10ND-** C1 145℃ OPEN	Measure the resistance between the terminals with a tester. (Coil wiring temperature -10°C ~ 40°C)	

Color of lead wire	Normal		
	MU-GD08ND- C1	MU-GD10ND- C1	MU-GD12ND- C1
C-R	3.12 ~ 3.82 Ω	2.41 ~ 2.96 Ω	1.32 ~ 1.62 Ω
C-S	4.32 ~ 5.29 Ω	3.33 ~ 4.08 Ω	2.05 ~ 2.52 Ω

Color of lead wire	Normal		
	MU-GD08ND - C1	MU-GD10ND - C1	MU-GD12ND - C1
WHT-BLK	222 ~ 272 Ω	338 ~ 415 Ω	124 ~ 153 Ω
BLK-RED	245 ~ 300 Ω	228 ~ 280 Ω	154 ~ 189 Ω

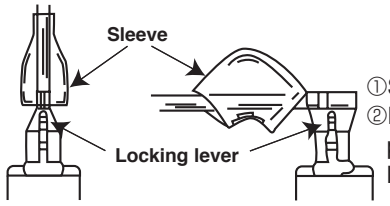
Ⓟ:INNER PROTECTOR

9 DISASSEMBLY INSTRUCTIONS

<"Terminal with locking mechanism" Detaching points>

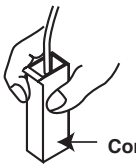
The terminal which has the locking mechanism can be detached as shown below.
There are two types (Refer to (1) and (2)) of the terminal with locking mechanism.
The terminal without locking mechanism can be detached by pulling it out.
Check the shape of the terminal before detaching.

(1) Slide the sleeve and check if there is a locking lever or not.



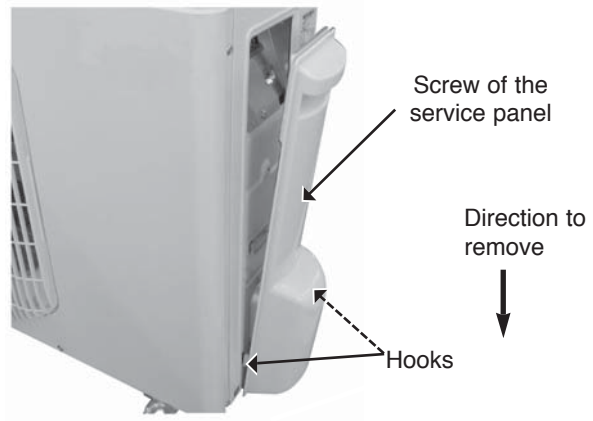
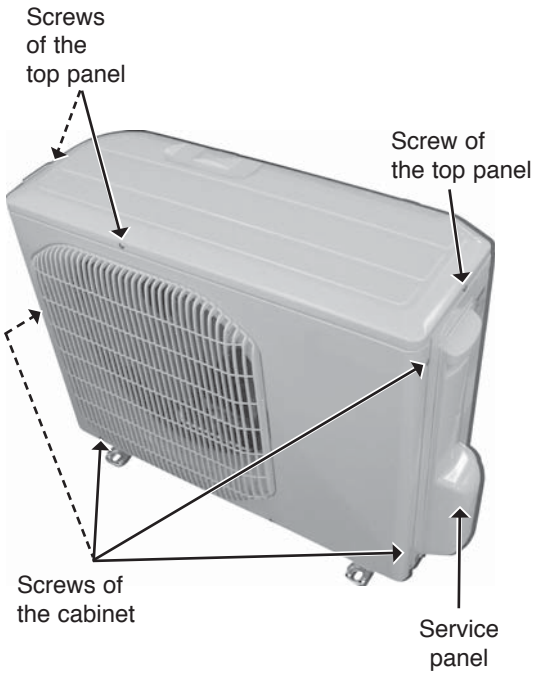
①Slide the sleeve.
②Pull the terminal while pushing the locking lever.

(2) The terminal with this connector has the locking mechanism.



①Hold the sleeve, and pull out the terminal slowly.

9-1. MU-GD08ND

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws fixing the top panel. (See Photo 1.) (2) Remove the top panel. (See Photo 1.) (3) Remove the screw fixing the service panel. (See Photo 2.) (4) Pull down the service panel and remove it. (See Photo 2.) (5) Remove the screws fixing the cabinet. (6) Remove the cabinet. (7) Disconnect the power supply and indoor/outdoor connecting wire. (8) Remove the screws fixing the back panel. (9) Remove the back panel. **Photo 2**  	**Photo 1** 

OPERATING PROCEDURE

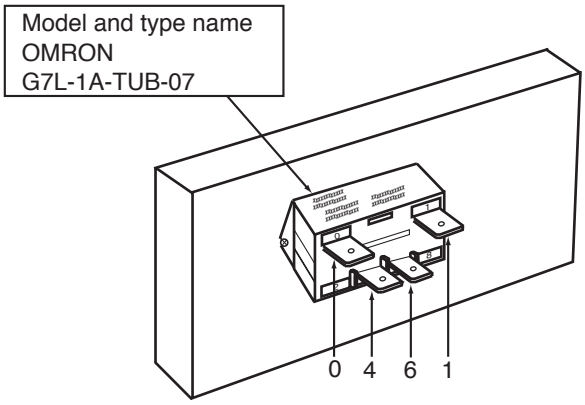
2. Removing the electrical parts

(1) Remove the service panel and the cabinet.(Refer to 1.)

(2) Remove the following parts.

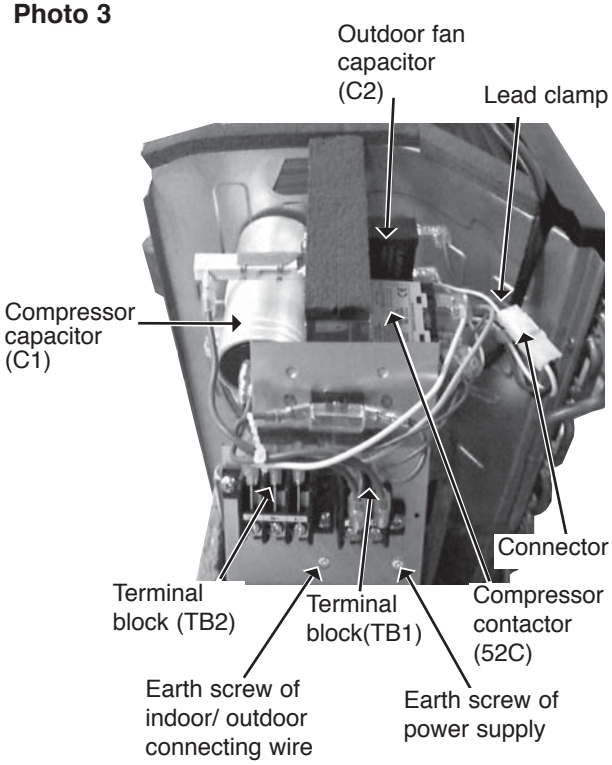
- •Compressor capacitor (C1)
- •Outdoor fan capacitor (C2)
- •Terminal block (TB)
- •Compressor contactor (52C)

NOTE : When attaching compressor contactor (52C) to relay panel, make sure that the side with printed letters is facing upward.



PHOTOS

Photo 3



3. Removing the propeller and the outdoor fan motor

(1) Remove the cabinet. (Refer to 1.)

(2) Remove the propeller nut and the propeller.

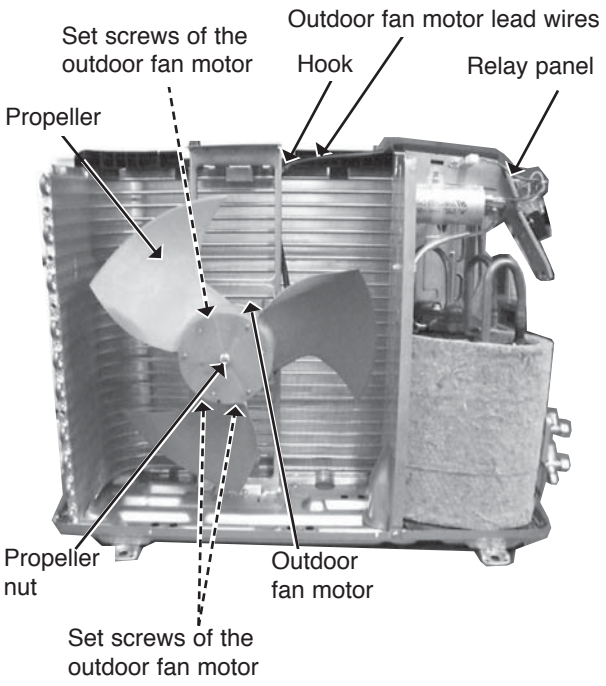
NOTE : Loose the propeller in the rotating direction for removal.
When attaching the propeller, align the mark on the propeller and the motor shaft cut section.
Set the propeller in position by using the cut on the shaft and the mark on the propeller.

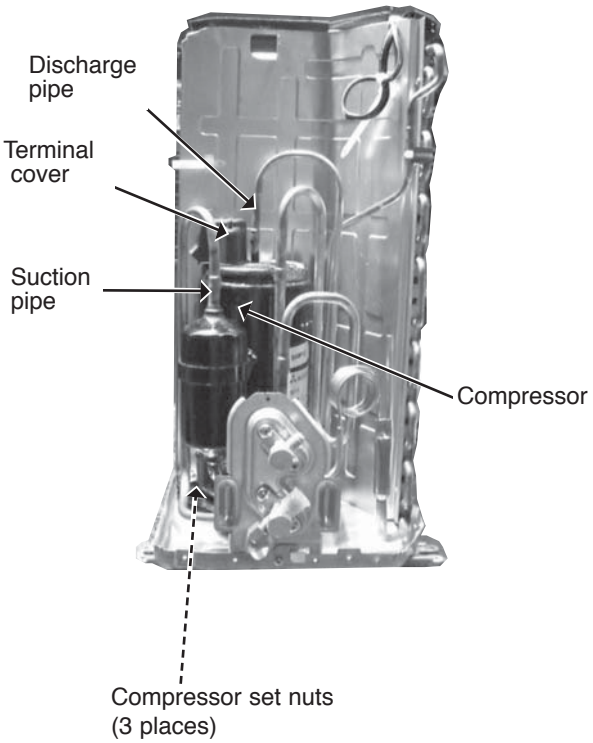
(3) Remove the lead clamps and outdoor fan motor lead wires.

(4) Remove the screws fixing the outdoor fan motor.

(5) Remove the outdoor fan motor.

Photo 4



OPERATING PROCEDURE	PHOTOS
4. Removing the compressor (1) Remove the cabinet. (Refer to 1.) (2) Remove the soundproof felt. (3) Remove the screws fixing the relay panel. (4) Remove the terminal cover. (5) Pull out the lead wires from the glass terminal of the compressor. (6) Recover gas from the refrigerant circuit. **NOTE :** Recover gas from the pipes until the pressure gauge shows 0 kg/cm² (0MPa). (7) Disconnect the welded part of the suction pipe and discharge pipe. (8) Remove the nuts fixing the compressor. (9) Remove the compressor.	**Photo 5** 

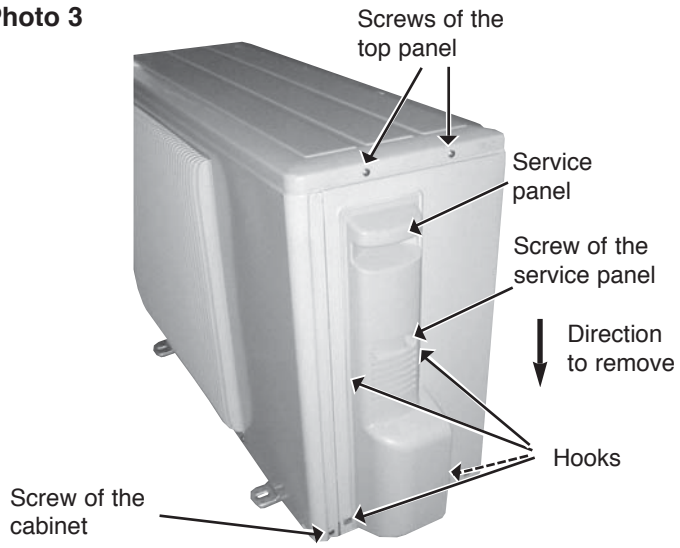
9-2. MU-GD10ND MU-GD12ND

OPERATING PROCEDURE

1. Removing the cabinet

(1) Remove the screws fixing the top panel. (See Photo 2 and 3.)
(2) Remove the top panel. (See Photo 3.)
(3) Remove the screw fixing the service panel. (See Photo 3.)
(4) Pull down the service panel and remove it. (See Photo 3.)
(5) Remove the screws fixing the cabinet.
(6) Remove the cabinet.
(7) Disconnect the indoor/outdoor connecting wire.
(8) Remove the screws fixing the back panel.
(9) Remove the back panel.

Photo 3



2. Removing the electrical parts

(1) Remove the service panel and the cabinet. (Refer to 1.)
(2) Remove the following parts.
•Compressor capacitor (C1)
•Outdoor fan capacitor (C2)
•Terminal block (TB)
•Compressor contactor (52C)

PHOTOS

Photo 1

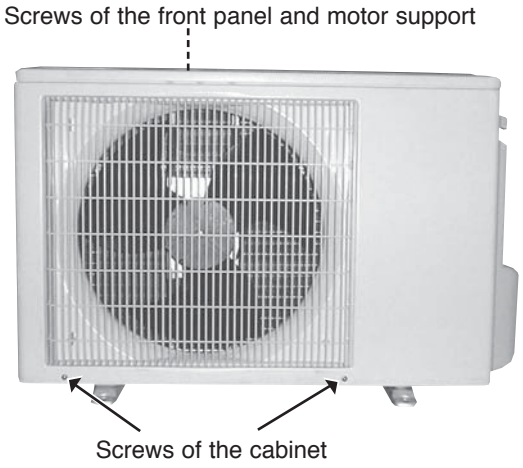


Photo 2

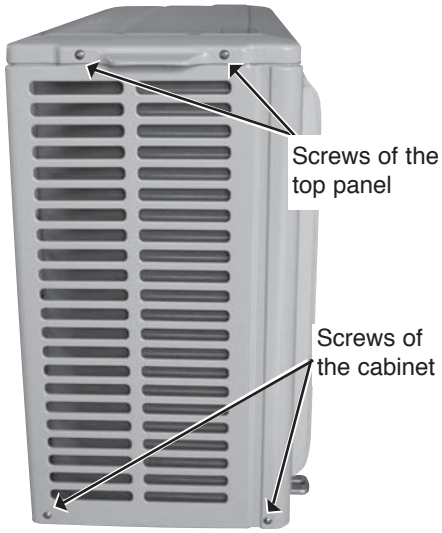
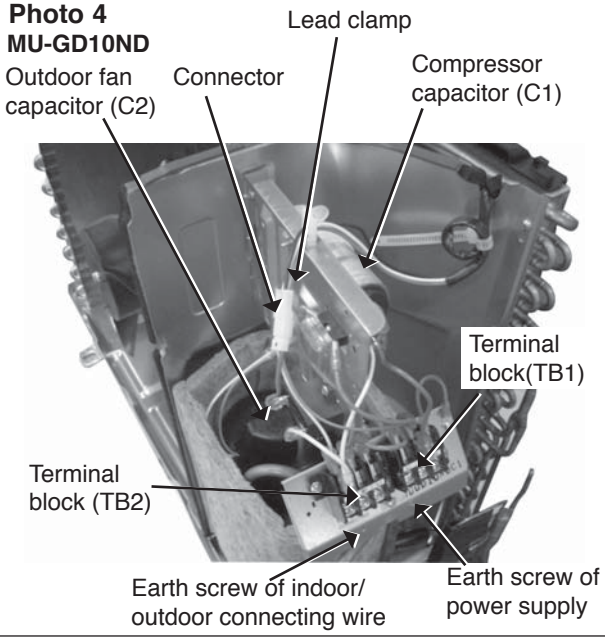
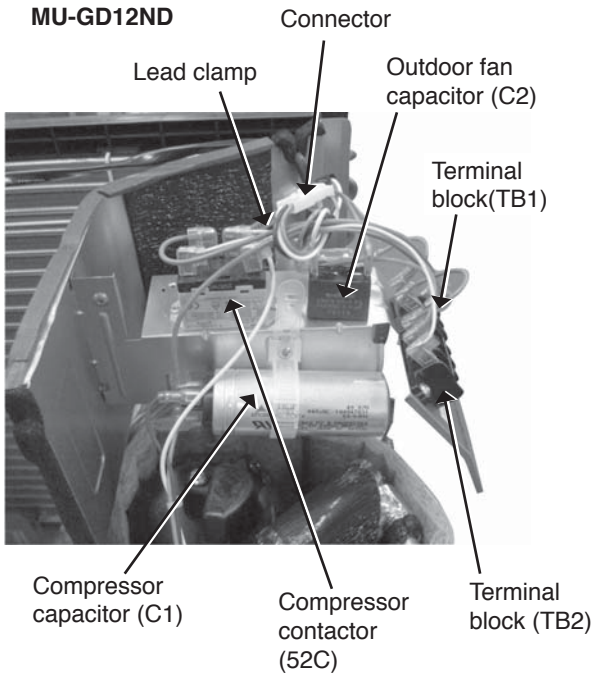
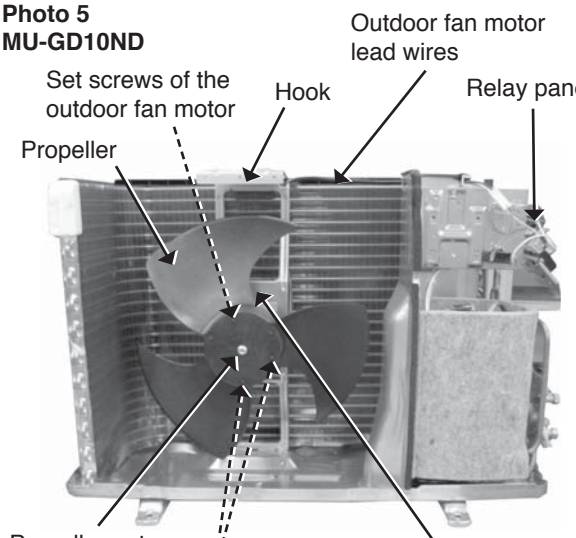
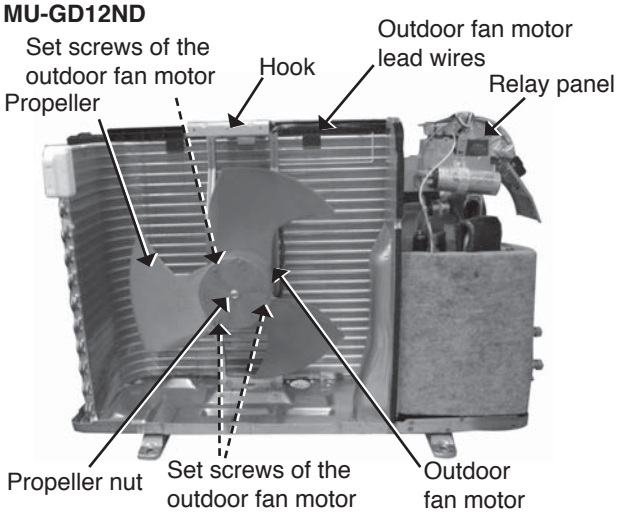


Photo 4
MU-GD10ND



OPERATING PROCEDURE	PHOTOS
	MU-GD12ND 
3. Removing propeller and the outdoor fan motor (1) Remove the cabinet. (Refer to 1.) (2) Remove the propeller nut and remove the propeller. **NOTE :** Loose the propeller in the rotating direction for removal. When attaching the propeller, align the mark on the propeller and the motor shaft cut section. Set the propeller in position by using the cut on the shaft and the mark on the propeller. (3) Disconnect the connector and remove the lead clamps and outdoor fan motor lead wires. (4) Remove the screws fixing the outdoor fan motor. (5) Remove the outdoor fan motor.	**Photo 5** **MU-GD10ND**  **MU-GD12ND** 

OPERATING PROCEDURE

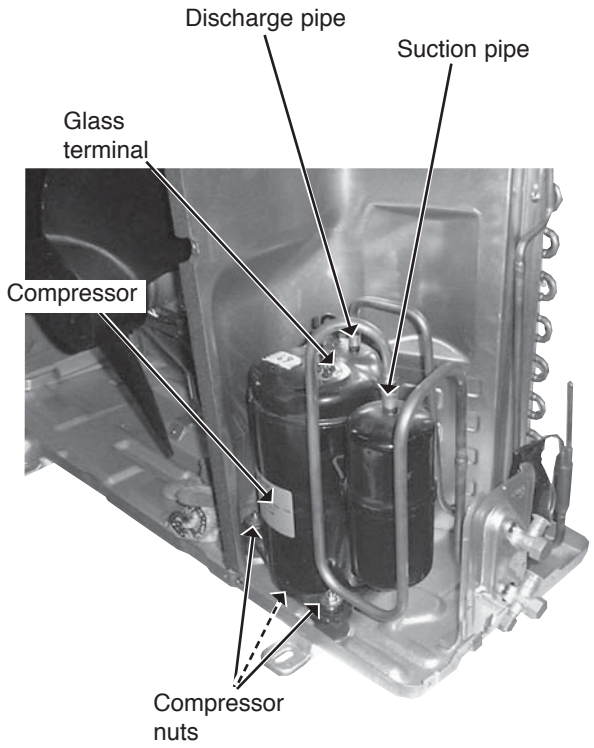
4. Removing the compressor

(1) Remove the cabinet. (Refer to 1.)
(2) Remove the relay panel.
(3) Remove the soundproof felt.
(4) Remove the terminal cover.
(5) Pull out the lead wires from the glass terminal of the compressor.
(6) Recover gas from the refrigerant circuit.
NOTE : Recover gas from the pipes until the pressure gauge shows 0 kg/cm^2 (0MPa).
(7) Disconnect the welded part of the suction pipe and discharge pipe.
(8) Remove the nuts fixing the compressor and the compressor.

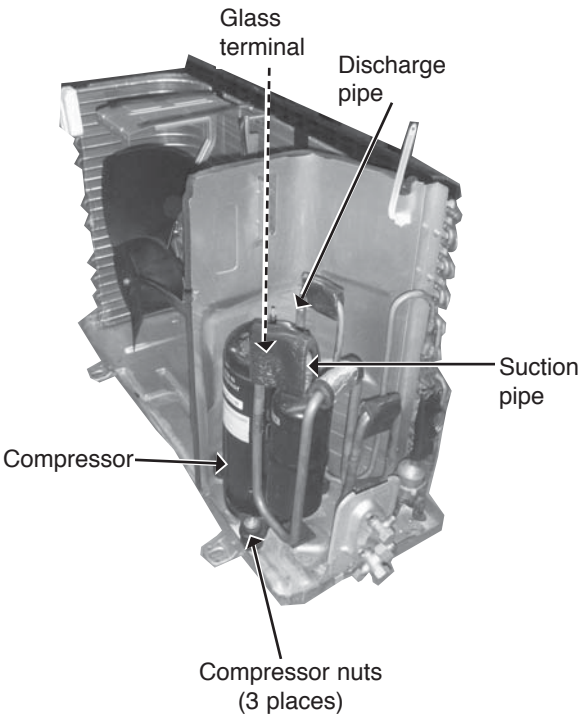
PHOTOS

Photo 6

MU-GD10ND



MU-GD12ND



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